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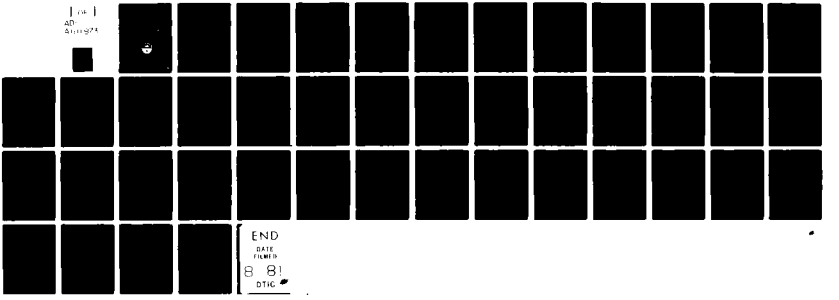

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QUALITY CIRCLES IN THE NAVY: PRODUCTIVITY IMPROVEMENT OR JUST ANOTHER PROGRAM?

NAVY PERSONNEL RESEARCH
AND
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San Diego, California 92152

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QUALITY CIRCLES IN THE NAVY: PRODUCTIVITY IMPROVEMENT OR JUST ANOTHER PROGRAM?

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One attempt to overcome declines in productivity and product quality by means of employee involvement is the Quality Control Circle (QC) Program. QCs are groups of employees from the same work area who meet regularly on a voluntary basis to identify and analyze work-related problems and recommend solutions to management. Interest in implementation of QCs is spreading rapidly in both the public and private sectors.

This report (1) provides information concerning QCs, (2) presents the results of a questionnaire that assessed the interest and involvement of Navy organizations in

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productivity improvement programs in general and QCs in particular, and (3) presents a plan, based on the results of the questionnaire, for implementing QCs in Navy organizations.

FOREWORD

This report was prepared in response to the increasing interest in Quality Control Circles (QCs) within Navy organizations. Its main objectives are to (1) describe QCs, (2) provide information regarding current interest and involvement in QCs in Navy and private sector organizations, and (3) provide sources of additional information for activities interested in developing QC programs in their own organizations. This report is also intended to provide feedback to the Navy activities that participated in the QC interest assessment conducted early this year.

Appreciation is expressed to the personnel in the activities under the Chief of Naval Material who responded to the interest assessment questionnaire. The 82 percent return rate was unusually high for mail-out questionnaires, demonstrating a cooperative attitude and high level of interest in productivity improvement.

Appreciation is also expressed to Mr. Dave Francis, for his assistance in designing the research plan, and to Ms. Janice Schreckengost, for her efforts in reviewing the literature.

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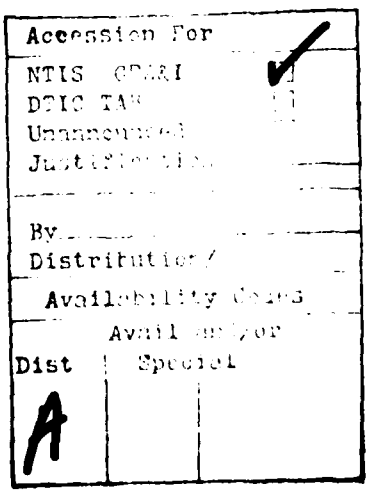

SUMMARY

Problem

In recent years, the concern over the decline of productivity in America has increased markedly. Interest in measures to improve quality of worklife, while still high, has assumed secondary importance to direct efforts to improve productivity.

One attempt to overcome declines in productivity and product quality by means of employee involvement is the Quality Control Circle program. Quality Control Circles, also called QCs, are groups of employees from the same work area who meet regularly on a voluntary basis to identify and analyze work-related problems and recommend solutions to management.

Many private American companies, as well as a number of Navy organizations, have begun QC programs, and interest in implementation is spreading rapidly. In spite of this increasing interest, little objective research has been done concerning the individual and organizational outcomes of QCs.

Objectives

The objectives of this effort were to (1) provide information on QCs, (2) assess the amount of interest in and involvement of Navy organizations in productivity improvement programs in general and QCs in particular, and (3) based on results of the assessment, develop a plan for QC research in Navy organizations.

Approach

1. Information on QCs was obtained by reviewing relevant literature and interviewing representatives of Navy and industrial organizations where QCs had been implemented.

2. A questionnaire designed to determine the stages of involvement and interest in QCs was developed and mailed out to 188 activities within the Naval Material Command (NAVMAT).

Results

1. Origin of QCs. The QC idea originated in Japan in the early 1960s when management theory was linked to the application of statistical techniques. Modern statistical quality control techniques were developed in America and first introduced to Japan in the early 1950s by Drs. Deming and Juran. The Japanese began teaching statistical quality control techniques to hourly employees and management. These ideas spread rapidly through major firms and, in 1962, these new quality control methods were tied to the theories of Maslow, Herzberg, and McGregor to produce the QC concept, which emphasizes that recognizing, developing, and utilizing the worker's intellectual potential will increase motivation and job satisfaction.

2. Implementation of QCs in America. It was originally believed that QCs could exist only under conditions found in Japanese organizations. Substantial differences in organizational structure, management style, employee loyalty, and cultural attitudes were frequently cited as reasons why QCs could not be transferred to Western corporations. Yet hundreds of American companies have been using QCs, many with only minor changes from the original conceptualization. Thorough evaluation of their success remains to be done.

3. The QC Process. QC programs are comprised of a coordinator or steering committee, one or more facilitators, QC leaders, and volunteer QC members. The primary objective of QCs is problem identification and solution. QC members are trained in problem-solving techniques (e.g., brainstorming, cause/effect diagrams) and group dynamics. The QCs work on problem identification, followed by analysis of the problem and problem-solving. After group members have researched the problem area thoroughly, the problem and proposed solutions(s) are presented to management. Once feasible solutions to a problem are suggested, the QC begins on a new problem and the cycle repeats itself.

4. Current Use of QCs in the Navy. Interest in using QCs in the Navy has increased steadily over the past 2 years. A number of Navy organizations have implemented QC programs and others have indicated interest. Organizations that have implemented QCs include the Norfolk Naval Shipyard, the Naval Ordnance Station at Louisville, the Naval Air Rework Facility at North Island, the Public Works Center at San Diego, and a number of others.

5. Reported Effects of QCs. Claims about the success of QCs fill the popular media but very few well-documented studies are available. Solutions developed by QCs are credited with such benefits as sizable cost savings, reduction of product defects, increased product quality, and greater safety awareness. Many organizations have also stressed the intangible benefits and "people building" aspects of QC participation. Reported shortcomings of QCs include member apathy and disenchantment and dissatisfaction by middle managers.

6. Assessment at Navy Organizaitons. Eighty-two percent of the QC interest questionnaires mailed to NAVMAT activities were returned. Analyses of responses indicated that 12-15 percent of the organizations assessed had already implemented QCs or were in the process of doing so. An additional 27, 51, and 41 percent of professional, white-collar, and blue-collar organizations, respectively, were interested in QC implementation.

Conclusion

In general, it can be concluded from these results that interest in implementation of and expectations from QCs is high. A number of organizations are in early stages of implementation and many more are interested. However, while expectations and reported effects of QCs are positive, it is still questionable as to whether QCs will result in long-lasting increases in productivity or morale. First, QCs have not been used widely in America, and although interest in the implementation of QC programs is increasing, systematic and long-term evaluations of program benefits are scant. It appears that perceptions of benefits are widespread, while hard supporting facts are few. Dollar savings have been documented for the solutions that QCs have recommended, but documentation of the dollar savings in related areas (e.g., reductions in absenteeism) is lacking.

Future Direction

A plan for an evaluation/research study of QCs in Navy organizations has been developed. This study will involve six organizations (three professional/white-collar and three blue-collar) and the effects of QCs will be compared under different experimental conditions. The types of effects to be measured are objective (e.g., leave usage) as well as subjective (e.g., attitudes, perceptions, levels of satisfaction). The results of this study should provide recommendations for activities interested in implementing QCs and significant insights into human behavior in organizations.

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INTRODUCTION

Problem

In recent years, the concern over the decline of productivity in America has increased markedly. Interest in methods to improve the quality of worklife, while still high, has assumed secondary importance to direct efforts to improve productivity.

One method used to overcome declines in both productivity and product quality by means of employee involvement is the Quality Control Circle program. Quality Control Circles, also called QCs, QC Circles, or Quality Circles, are groups of employees from the same work area who meet regularly on a voluntary basis to identify and analyze work-related problems and recommend solutions to management. In addition to solving problems, these circles are credited with improving employee morale and productivity. Over 200 American companies, including divisions of such corporate giants as General Motors, Hughes Aircraft, and Westinghouse, as well as a number of Navy organizations, are now using QCs. QCs are generating increasing interest from corporations and have received a great deal of attention from the popular media, including recent coverage on NBC-TV (White Paper, 1980) and in Newsweek (The Productivity Crisis, 1980). In spite of this increasing interest, very little solid research exists on the subject.

Objective

The objectives of this effort were to (1) provide information on QCs, (2) assess the amount of interest in and involvement of Navy organizations in productivity improvement programs in general and QCs in particular, and (3) based on results of the assessment, develop a plan for QC research in Navy organizations.

APPROACH

Obtaining Information on QCs

Information on QCs was obtained by reviewing relevant literature and interviewing representatives of Navy and industrial organizations where QCs had been implemented.

Assessment of QC Interest/Involvement Among Navy Organizations

Questionnaire

Due to increasing interest in QCs among Navy organizations, NAVPERSRANDCEN designed a questionnaire to assess the amount of their interest and involvement in productivity improvement programs in general and QCs in particular. Specifically, this questionnaire assessed the amount of familiarity with the concept of QCs, expectations of positive outcomes from QCs, potential obstacles to implementation of QCs, state of interest or involvement in QC implementation, and overall reactions to QC programs. A copy of the questionnaire is included as Appendix A.

Sample and Administration

In November 1980, each of the 188 activities within the Naval Material Command was provided a questionnaire and envelope for its return. In January 1981, those who had not responded (about 40%) were sent a second copy and asked to complete and return it. At the end of March 1981, 82 percent (N = 156) had been completed and returned.

RESULTS

Information on QCs

Origin of the QC Idea

The QC idea originated in Japan in the early 1960s, when management theory was linked to the application of statistical techniques. Modern statistical quality control techniques were first introduced to Japan by America in the early 1950s through W. Edward Deming's lectures on statistical methodology and J. M. Juran's courses on management of quality control (Juran, 1967). Juran emphasized that quality control should be practiced at all levels of management; the Japanese expanded upon this and taught statistical quality control techniques to hourly employees as well as to management (Cole, 1979a). These ideas spread rapidly through many major firms and, in 1962, Dr. Kaoru Ishikawa tied these new quality control methods to the theories of Maslow, Herzberg, and McGregor to produce the QC concept, which emphasizes that recognition, development, and utilization of the intellectual potential of the worker will increase motivation and job satisfaction. QCs also seek to satisfy human creative and social needs. The Union of Japanese Scientists and Engineers (JUSE) encouraged the use of QCs and began QC training courses, including a series of radio and television programs (Cole, 1979b) describing QCs.

QCs in Japan

Robert Cole, an expert on QCs in Japan, estimated that, in 1978, four million or approximately one out of eight Japanese workers were involved in QCs or similar forms of small group activities. Other estimates run as high as ten million (Dewar, 1979). It is estimated that the problems solved by QCs have saved billions of dollars. These savings have contributed to the increase in productivity and product quality that have been instrumental in Japan's rise in the world market. In addition, Japanese corporations have found that QCs raise employee morale, improve management/worker relations, and develop members' leadership abilities (Cole, 1979a).

It was generally believed that QCs could exist only under the conditions found in Japanese organizations. Substantial differences between Japanese and Western organizations in organizational structure, management style, employee loyalty, and cultural attitudes were frequently cited as reasons why QCs could not be transferred to Western corporations. Juran (1967) discusses these differences in detail. He emphasizes that the high fringe benefits willingly offered by Japanese corporations, as well as the tradition of life-long employment, produce a worker/management relationship based on mutual loyalty. Improvements that benefit the organization benefit the employee and vice versa. This loyalty is contrasted to the American situation in which workers and unions tend to see management as an adversary. Japanese management generally involves more employee input into decisions than does American management style. Juran also believes that Japanese motivational priorities are different from Western priorities; he identifies "improving company performance" as the most important priority to Japanese workers, while monetary incentives are of low priority. It is also suggested that Japanese culture emphasizes group interaction rather than the individualism emphasized in America.

It is assumed that QCs function best in organizations where a participative management style is present and where mutual loyalty and respect exist between workers and management. If this is true, some adjustments in American organizations or in QC programs may be necessary for widespread QC success in America, but this has yet to be determined.

QCs in America

Given these differences between American and Japanese organizations, it is not surprising that the first attempts to modify QCs for implementation in U.S. industry in the early 1970s met with little success. This lack of success has been attributed to the radical departure from the methods used by the Japanese (Rieker, 1977). In 1974, however, Wayne Rieker of Lockheed Missile Systems Division started a QC program that closely followed Japanese methods and used Japanese training materials. Based on early evaluations of their QCs, Lockheed reported increased employee satisfaction and savings of $3 million in a 2-year period (Schleicher, 1977; Yager, 1979). Following this success, Rieker and two of his colleagues, Donald Dewar and Jefferson Beardsley, left Lockheed. Each set up his own QC consulting firm. The Lockheed program suffered greatly from this loss. Without these key figures, the necessary management support declined. The program reached its peak in 1977 with 30 QCs but presently consists of only 5 (Rieker, 1980). However, the QC concept itself did not suffer. In fact, it was expanded as a function of Rieker, Dewar, and Beardsley's efforts. Rieker's firm, Quality Control Circles, Inc., has begun over 100 QC programs. Dewar and Beardsley, besides operating consulting firms, have created the nonprofit International Association of Quality Circles (IAQC). These organizations provide the most accessible sources of information about QCs, although their views are probably somewhat biased in favor of QCs. The programs prescribed by the three firms are quite similar, although the training and implementation procedures differ somewhat. While the Navy does not specifically endorse any of these firms, information on contacting them can be found in Appendix B.

The QC Process

Most QC programs are comprised of a coordinator or steering committee, one or more facilitators, QC leaders, and volunteer QC members. The roles of the various positions are described in detail by both consultants and program coordinators in the IAQC International Conference Transactions (yearly). Briefly, the coordinator or steering committee has authority over the program objectives, operating guidelines, and expansion of the program. Rieker (1980) recommends that the coordinator be an executive-level line manager to ensure management support and adequate funding. On the other hand, Dewar and Beardsley recommend the use of a steering committee comprised of employees representing a broad range of interests, such as production, engineering, finance, personnel, and the union (Beardsley, 1979).

The QC consultant provides facilitator training and instructional materials. The facilitator is responsible for the actual implementation and operation of the program, for training leaders and members in problem-solving techniques, and for training leaders in group dynamics. The facilitator should be a capable supervisor and should have some training skills. Most consultants recommend that the facilitator position be full-time.

The QC leader is generally a foreman or supervisor within the QC work area; he assists the facilitator in training circle members and conducts circle meetings. Voluntary circle members meet weekly, initially to receive training and then to work on projects.

After training, the QCs work on problem identification. Both QCs and management may identify problem areas, but the QC itself selects the problems to be worked on. QC projects usually concern product quality, equipment, efficiency, cost reduction, or safety. Analysis of the problem and problem solving then follow, using techniques such as brainstorming, data gathering, check-sheets, cause-effect diagrams, and histograms. After group members have researched the problem area thoroughly, the QC presents the problem and proposed solution to management. Management must respond to the

suggestion within a short, specified time period, either by taking steps toward implementing the QC's solution or by explaining why implementation is not feasible. According to Dewar (1979), over 80 percent of all QC solutions have been accepted and implemented. The facilitator is often responsible for overseeing solution implementation. Once feasible solutions to a problem are suggested, the QC begins on a new problem and the cycle repeats itself.

QCs at most corporations follow this process with little variation. Consultants insist that these methods are the best way for achieving success with QCs, so clients follow them carefully. Hughes Aircraft and Honeywell provide notable deviations from the consultant prescribed methods. Their programs, two of the oldest in the United States, were set up before QC consulting services were available. Both programs have successfully expanded to numerous divisions despite their variations. This long-term success warrants further discussion of their methods.

QCs in the Private Sector

The Hughes program began in 1976. Consultants were not used at the time, but Hughes now employs the Rieker training materials for some 200 QCs in 17 divisions. The Hughes method is similar to that prescribed by consultants and by the Japanese in all but one respect. Hughes QCs are not ongoing; after a trial period of 3 to 8 months, they may disband or reduce the frequency of their meetings until a new problem arises. In this manner, QCs are aimed at solving fewer but more urgent problems. Members at Hughes recognized that QCs can be very demanding and emotionally taxing on employes and management. They feel it is essential to the program's success to give employees a break between projects. Employee burnout may become a more salient issue to all QC programs as they continue to operate over long periods of time.

The Honeywell program was set up in 1974 by Michael Donovan, one of the few behavioral scientists involved in the management-dominated QC field. The corporation now has 120 QCs in 5 major divisions. The existing program has evolved from experience, and departs from the consultant method in several respects. First, participation is not strictly voluntary; all workers are encouraged to at least try the program. Honeywell does not stress training of QC members in problem-solving techniques. They have found that QCs can be very successful with little or no formal training (Sikes, Connell, & Donovan, 1980).

In the private sector, QC programs exist primarily in blue and white collar areas of manufacturing corporations. Besides Hughes Aircraft, Lockheed, and Honeywell, QCs are in use at Westinghouse, Solar Turbines International, and Northrop. Points of contact at these corporations are listed in Appendix B. QC programs used in service organizations such as banks and hospitals have been reported to be less successful, but are still considered feasible. Their limited success may be due to the fact that service organizations have a less tangible product and productivity, or cost-saving gains, may be more difficult to measure.

Current Use of QCs in the Navy

The QC idea spread slowly at first, but interest has greatly increased over the past 2 years. A number of Navy organizations have implemented QC programs and others have indicated interest. The programs at Navy organizations have all been implemented with the aid of a formal facilitator training package. In addition to the private consulting firms, the Naval Material Command also has provided some QC training and may have helpful suggestions for Navy organizations interested in starting QCs. The Norfolk Naval

Shipyard (NNSY) program began in June 1979. NNSY presently has 30 Circles and hopes to expand the program. Management is very enthusiastic about their program and believe it is successful in terms of both cost savings and improving the quality of worklife at NNSY. The Naval Ordnance Station in Louisville (NOSL) began a program in November 1979 with six QCs. Some problems arose in maintaining employee interest, but management is satisfied with the program and would like to see it continued. A program was implemented at the Naval Air Rework Facility (NARF), North Island in March 1980 with seven QCs. NARF now has over 40 QCs and is training more leaders. It reports that enthusiasm is very high, cost savings have been great, and management is very supportive. A program is also in the early stages of operation at NARF, Alameda. The NARF plans to use a consulting firm's training program and hopes to have operational QCs by June 1981. The Public Works Center, San Diego and Naval Supply Center, San Diego are in the training stages, and will have QCs before 1982. The Naval Electronic System Engineering Center in Vallejo is one of the few Navy organizations currently using QCs with professional/white-collar employees. Thus far, reports are very favorable. (A list of Navy contacts as well as a form for ordering a QC videotape produced by NNSY, are included in Appendix B.)

Impact of QCs

Claims about the success of QCs fill the popular media, but very few well documented studies are available. However, QCs appear to have many positive effects. QC solutions are credited with sizable cost savings; documented return on investment has been reported to be between 2:1 and 8:1 (Nelson, 1980). Lockheed, for example, documented savings of almost $3 million in 2 years with 15 QCs in operation. They also reduced defects by over 80 percent (Yager, 1979). Reduced product defects, increased product quality, and greater safety awareness have also resulted from QC efforts. While hard measures of improved productivity are usually not reported, most companies using QCs cite supervisor observations and meeting production schedules as indicators of the positive QC effects. Northrop and others cite personnel benefits such as marked reductions in absenteeism, grievances, and terminations. Many companies tend to stress the intangible benefits and "people building" aspects of QCs. Indeed, this was one of the initial goals of QC programs. Attitudinal surveys from Lockheed, Westinghouse, NOSL, and others show that a majority of participants believe that QCs make their jobs more enjoyable, improve communication with management, and improve relationships with co-workers. Almost all workers feel that the programs should be continued and expanded (Schleicher, 1977). Though little systematic research has been published, most people seem to agree that QCs provide many benefits.

Potential Shortcomings of QCs

The available literature seldom mentions failures or problems with QC programs. When mentioned, failure is often attributed to poor administration of the program. Cole's review (1979b) of QCs at Toyota Auto Body, however, suggests problems with the method's long-term viability. Cole reports that the 1975 company morale survey indicated that 30 percent of the workers considered QCs to be a burden; 3 years earlier, the rate had been only 20 percent. Competition and pressure to perform well at Toyota may have influenced these percentages, but increasing dissatisfaction with time deserves careful attention. Another problem reported by an increasing number of Japanese and American companies is member apathy and disenchantment (Cole, 1979a; Comstock, & Swartz, 1980). Comstock and Swartz (1980) consider disenchantment a predictable state in the life of a QC that comes when the novelty of problem solving wears off. They stress that it need not destroy a QC, but that QCs in this stage demand extra effort from the facilitator and leader. When apathy or dissatisfaction sets

in, the facilitator or leader may try a number of techniques to restore interest. Some that have been suggested are: (1) letting the group take some time off from QC meetings, (2) conducting some meetings for the purpose of communicating with each other without the emphasis on problem solving, and (3) presenting the group with an easily solved problem to renew enthusiasm.

In addition to member apathy, Cole (1980) discusses some obstacles that should be overcome to make QCs work in the U. S. If the concept of QCs is to have a reasonably good chance of being implemented and sustained successfully in American industry, adjustments must be made. According to Cole, it must be recognized that QCs are not a panacea for solving problematic worker-management relations or improving product quality; rather, they provide a vehicle for worker contribution to the organization.

Another adjustment to the QC concept that American companies must make concerns union involvement. If QCs are to succeed in organizations with a strong union, the union must be included in the program. If unions perceive that QCs are simply a management program to extract more from workers, they may react negatively and put pressure on workers not to cooperate with what they might view as a form of exploitation by management.

Cole also suggests that monetary incentives or rewards in the form of recognition play a significant role in QC programs if QC activity is to be sustained beyond a short period of time. While Japanese firms have discouraged the use of monetary rewards, the life-long career patterns of Japanese employees with one company include a reward system (e.g., guaranteed promotions and bonuses) different from that found in American industry.

The inclusion of financial incentives for QCs should not replace the nonmonetary rewards such as recognition and satisfaction derived from problem solving. Managers should be aware that these intrinsic rewards are necessary for QC success and should not underestimate their importance.

A final area in which adaptation will have to take place is involvement of all levels of management (cf. Rieker, 1980). Some organizations tend to implement QCs in a top-down fashion, which leads workers and mid-level managers to see QCs as another "management program." Lack of middle management support has been shown to be a major impediment to the success of QC programs in many American companies (personal communications with program coordinators). Middle managers must be included to avoid feelings of uselessness, and lost authority.

Other areas for caution were suggested by Amsden and Amsden (1980). Management's objectives must not be too narrow. If they see QCs solely as a means to save money or as a motivator of employees, this will cause difficulties. Also, QCs should not be implemented too fast. A successful QC program requires changes in management's thinking and attitudes. The organization must be convinced that the key to productivity lies in its people--in their commitment, involvement, and participation. Where necessary, these changes in philosophy must be made gradually and may become problematic if the QC program explodes too fast. The authors also stress that QCs should not be adopted "because everyone else has them," nor should they be seen as a cure-all forced upon employees by management.

While these issues concern the success of a QC program, the coordinator of Northrop's program indicated that there were a number of reasons for the failure of particular QCs, including attrition of QC members (e.g., transfers to another division or

promotions), lack of leadership ability on the part of a QC leader, and lack of support by supervisors of QC members.

As a final recommendation regarding consultant services, Amsden and Amsden (1979) suggest that organizations ask consultants to check periodically on their program after it is introduced, so organization members will not have to work out all of the "bugs" unassisted.

Current QC Research

Several researchers provide the majority of the current American academic literature on the subject of QCs. Research is now being done by Frank Gryna, an industrial engineer at Bradley University, that may provide new insights into the QC process.

Another researcher, Robert Amsden, Professor of Management at the University of Dayton, has been involved with QCs for some time. He and Davida Amsden have authored many publications and edited the book entitled QC Circles: Applications, Tools, and Theory (1976). In a 1979 article, they proposed research designed to identify the essential components of the QC and to quantify relationships between various aspects of QC activities (Amsden & Amsden, 1979). Those results are described in Amsden and Amsden (1980) and appear in brief form in the annotated bibliography found in Appendix C.

The development of QCs in Japan has been investigated by an expert on Japanese industry, Robert Cole of the University of Michigan. His book, entitled Work, Mobility, and Participation (1979a), includes chapters on Japanese QCs in general, as well as a case study of Toyota Auto Body QCs.

In summary, the aforementioned researchers provide the majority of the current American academic literature on the subject of QCs. Some of these documents are not easily accessible. Popular literature, on the other hand, abounds, but it is often repetitive or misleading. Consultant literature is also plentiful, but is aimed at selling the product. Literature from corporate leaders is informative; however, few corporations will release their in-house surveys and reports. The most comprehensive collections of QC information available can be found in the annual IAQC International Conference Transactions, and in issues of the IAQC Quality Circle Quarterly and The Quality Circles Journal.

QC Interest/Involvement Among Navy Organizations

The questionnaire sent to Navy organizations initially asked respondents descriptive questions about their organization (Item I.5, A-1). Of particular interest was whether professional, white-collar, or blue-collar employees comprised the largest work group within the organization. As seen in Table 1, the largest percentage of organizations (41%) was predominantly white-collar, followed by 35 percent blue-collar, and 24 percent professional. Interestingly, 75 percent (N = 114) of all organizations were somewhat or very familiar with the concept of QCs; only 27 percent (N = 42) were not familiar with the concept (Item II. 15, A-3).

With respect to the questions assessing stage of involvement in QCs (Item II. 20-31, A-5 and 6), 21 organizations--8 blue-collar, 8 white-collar, and 5 professional--already had a QC program underway (Table 2). "Already" was defined as having QCs, or at least having already trained a QC facilitator for the organization. An additional 47 (30%) organizations reported that, while not yet in process, they believed QCs could be successful in their organization (Item II.17, A-4). When looking only at those who

responded that they were somewhat or very familiar with QCs, the percentages interested in QC implementation were 41, 51, and 27 percent for blue-collar, white-collar, and professional organizations, respectively.

Table 1

Navy Respondents' Familiarity with QCs

Type of Organization	Total N	Percent of Total	Not at all Familiar N	Not at all Familiar Percent by org. type	Somewhat Familiar N	Somewhat Familiar Percent by org. type	Very Familiar N	Very Familiar Percent by org. type
Blue Collar	55	35	18	33	27	49	10	18
White Collar	63	41	16	25	38	60	9	14
Professional	38	24	8	21	22	58	8	21
Total	156		42		87		27	

Table 2

QC Implementation at Navy Organizations

Type of Organization	Already Implemented			Would be Successful			Would Not be Successful			No Response		
	N	Percent by org. type	Percent of those somewhat/very fam. with QC	N	Percent by org. type	Percent of those somewhat/very fam. with QC	N	Percent by org. type	Percent of those somewhat very fam. with QC	N	Percent by org.	Percent of those somewhat very fam. with QC
Blue Collar	8	15	22	15	27	41	8	15	22	6	11	16
White Collar	8	12	17	24	38	51	12	19	26	3	5	6
Professional	5	13	17	8	21	27	13	34	43	4	11	13
	21			47			33			13		

A follow-on question asked respondents who felt that QCs could be successful to state what they would expect the positive outcomes to be (Item II. 18, A-4). Table 3 presents a listing and frequencies of responses given to this open-ended question. As can be seen, increased morale and productivity improvement were the expectations most often provided, but a wide variety of positive outcome expectations were mentioned.

Returning to Table 1, we find that 43 percent of the professional organizations familiar with QCs felt they could not be successful, compared to only 26 percent and 22 percent of white and blue-collar organizations. Table 4 presents frequencies by type of organization for reasons given as to why QCs could not be successful (Item II. 19, A-4). The small size of the organization or the unsuitability of the type of personnel were the reasons most often given. It is of interest that lack of management support was given as a reason in only 4 out of 33 organizations.

Table 3

Expected Positive Outcomes of Quality Circle Implementation

Outcome	Overall Frequency	Frequency by Type of organization		
		Professional (N = 13)	White Collar (N = 32)	Blue Collar (N = 23)
Increased morale	30	7	12	11
Productivity improvement	29	8	12	9
Increased communication	23	6	7	10
Improved quality	17	0	5	12
Cost savings	14	1	6	7
Method improvements	10	1	6	3
Teamwork	9	2	4	3
Problem solving	9	3	5	1
Increased satisfaction	9	4	1	4
Increased efficiency/reduced rework	7	2	2	3
Greater participation in the organization	5	1	3	1
Problem identification	4	1	3	0
Increased motivation	4	0	2	2
Better customer service	4	0	2	2
Meeting schedules	4	0	1	3
Pride in work	3	0	1	2
Leadership development	3	0	1	2
Good ideas	3	1	2	0
Improved job accomplishment	3	1	0	2
Enhanced worker/management relations	3	0	1	2
Improved attitudes	3	1	0	2
Improved performance	2	1	1	0
Enhanced coordination	2	1	1	0
Employee knowledge	2	1	1	0
Utilization of the human element	2	2	0	0
Employee sense of responsibility	2	1	0	1
Management improvement	2	0	1	1
Participation in decisions	2	0	1	1
Improved work conditions	2	0	0	2
Increased awareness of job requirements	2	1	1	0
Improved quality of worklife	2	0	1	1
Improved commitment	2	0	0	2
Increased involvment of people near the problem	2	0	1	1
Identification of impediments	1	0	0	1
Standardization of method	1	1	0	0
Greater individual job flexibility	1	1	0	0
Reduced labor hours	1	0	1	0
Avenue for suggestions	1	0	1	0
Program feedback	1	0	1	0
Mutual understanding	1	0	1	0
Avoidance of repeated mistakes	1	0	1	0
Greater accuracy	1	0	1	0
Advantages of participative management	1	1	0	0
Visibility of management support	1	0	0	1
Better understanding of "big picture"	1	1	0	0
Realistic attitude toward problem solving	1	0	1	0
Greater willingness to implement change	1	1	0	0
Recognition	1	0	1	0
Increased quantity	1	0	0	1
Increased interest in command objectives	1	0	1	0
Increased job enthusiasm	1	0	1	0
Job enrichment	1	0	0	1
Employee development	1	0	0	1

Note: Based on responses of organizations who already had QCs or who felt they could be successful in their organization.

Table 4

Obstacles to Quality Circle Implementation

Obstacle	Overall Frequency	Frequency by Type of organization		
		Professional (N = 13)	White Collar (N = 12)	Blue Collar (N = 8)
Organization too small	11	7	2	2
Personnel unsuited	10	4	3	3
Tasks unsuited	5	1	2	2
Lack of management support	4	1	3	0
No incentive for employees to participate	3	2	0	1
Don't need another program	3	2	1	0
QC may not work in military organization	1	1	0	0
Don't expect QC to have a lasting effect	1	1	0	0
Activity adheres to rigid procedures	1	0	1	0
Lack of employee interest	1	0	0	1
Concept of QC not good	1	0	1	0

Note: Based on responses of organizations who felt QCs could not be successful in their organization.

CONCLUSIONS AND DISCUSSION

In general, it can be concluded from these results that interest in implementation of and expectation from QCs is high. A number of organizations are in early stages of implementation and many more are interested. However, while expectations and reported effects of QCs are positive, it is still questionable as to whether QCs will result in long-lasting increases in productivity or morale. First, QCs have not been used widely in America, and although interest in the implementation of QC programs is increasing, systematic and long-term evaluations of program benefits are scant. It appears that perceptions of benefits are widespread while hard supporting facts are few. Dollar savings have been documented for the solutions that QCs have recommended, but documentation of the dollar savings in related areas (e.g., reductions in absenteeism) is lacking.

Responses to the questionnaire showed that many Navy organizations are expressing interest in implementing QCs. Before the Navy develops a Navywide QC implementation plan, however, it would be advisable to examine as thoroughly and objectively as possible

the effects of QCs upon both organizations and the individuals within them. The types of effects that should be examined include cost savings from ideas generated, product error rates, leave usage, turnover, grievances, output quantity and quality, performance, individual commitment to the organization, satisfaction, esprit de corps, attitudes toward the program and supervision, and perceptions of job characteristics.

Since it is highly likely that one set of QC program characteristics would not be optimal in all types of organizations, it would be prudent to consider the differential effects of QCs as a function of both organizational and QC program characteristics.

As a preliminary effort, NAVPERSRANDCEN representatives have reviewed the available literature, attended QC meetings and conferences, visited Navy organizations with QCs, sat in QC meetings and QC facilitator training, and have designed and administered QC interest questionnaires. These sources of information confirmed the definite need for objective evaluation of QCs and also suggested a number of specific questions worthy of research. First, are white-collar and professional organizations as likely to benefit from QCs as more production-oriented, blue-collar organizations? Organizational theorists, such as Charles Perrow (1970), suggest that nonroutinized, less bureaucratic organizations likely to employ professionals also have different structural characteristics and management practices. It may be that the structural characteristics and the tasks performed in professional organizations would decrease the positive impact of QCs.

A second question of interest is how much, if any, recognition is necessary to keep employees motivated to participate in QCs? Research on intrinsic motivation has suggested that an overjustification effect may occur when individuals, originally intrinsically motivated, are extrinsically rewarded for performing particular tasks and, consequently, become less intrinsically motivated to perform those same tasks (Deci, 1971; Kruglanski, Alon, & Lewis 1972). It has also been suggested that the overjustification effect is more likely to occur with voluntary tasks (Calder & Staw, 1975), which may make QC participation more vulnerable to this effect. In contrast, traditional behaviorists would contend that behaviors would be more likely to be repeated when followed by a reward. Perhaps individual differences or job characteristics are related to the effects of level of recognition. It would be of interest to see the effects of levels of reward/recognition upon the attitudes and productivity of QC members. For example, the effects of need for recognition may differ for professional and blue-collar employees.

In addition to the issues, the following questions need to be investigated: (1) whether the concept of QCs per se has positive effects or whether such effects are due merely to the attention to employees' work (i.e., "Hawthorne Effect") and (2) whether there are spillover effects upon members indirectly involved in QCs.

FUTURE DIRECTION

NAVPERSRANDCEN has developed an evaluation/research plan that should answer a number of questions concerning the effects of QCs upon individuals and upon organizational functioning. Plans call for work with six organizations (three professional/white collar and three blue collar) in order to obtain some comparisons of the effects of QCs under different experimental conditions. The types of effects to be measured are objective (e.g., leave usage, turnover) as well as subjective (e.g., attitudes, perceptions, levels of satisfaction).

This study should provide insights into the applicability of and expected effects from QCs in professional and blue-collar organizations. It should also indicate the necessity for high levels of recognition to promote participation and interest in QCs. This research should give useful guidance for implementation of QCs in Navy organizations, and at the same time provide significant insights into human behavior in organizations that will be of interest to the research community.

REFERENCES

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Cole, R. E. Work, mobility, and participation. Berkeley: University of California Press, 1979. (a)

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Perrow, C. Organizational analysis: A sociological view. Monterey, CA: Brooks/Cole, 1970.

Rieker, W. S. What is the Lockheed Quality Control Circle program? Women's Apparel, January 1977, 32-34.

Rieker, W. S. Management's role in QC circles. IAQC International Conference Transactions, 1980, 42-46.

Schleicher, W. F. Quality control circles save Lockheed nearly $3 million in two years. Quality, May 1977, 14-17.

Sikes, W., Connell, T., & Donovan, J. M. Learning from experience: Ingredients for success and popular myths about quality circle programs. IAQC International Conference Transactions, 1980, 90-95.

Yager, E. Examining the Quality Control Circle. Personnel Journal, 1979 58(10), 682-684, 708-709.

The Productivity Crisis. Newsweek, 8 September 1980, 50-69.

White paper: If Japan Can . . . Why Can't We? NBC-TV, 1980, 80 minutes.

APPENDIX A

PRODUCTIVITY QUESTIONNAIRE

PRODUCTIVITY QUESTIONNAIRE

As part of the Chief of Naval Material's continuing efforts to improve productivity, the Navy Personnel Research and Development Center is conducting a survey concerning productivity programs. Specifically, we want to determine the degree of success organizations have had with existing programs, as well as the degree of interest in and feasibility of implementing new programs. Since it is necessary to obtain information from each activity, if you cannot complete the questionnaire, a phone call to update us on your thoughts on this matter would be appreciated (Phone AV 933-6935; (714) 225-6935; Leanne Young).

INSTRUCTIONS

1. This questionnaire consists of a number of questions; some may be answered by checking an appropriate response, while many call for a written response. Please answer all of them as thoroughly as possible. If you need more space feel free to write on the back of the questionnaire, or attach additional sheets.

2. After completing the questionnaire please mail it to the Navy Personnel Research and Development Center using the pre-addressed stamped return envelope provided.

THANK YOU FOR YOUR COOPERATION!

I. DESCRIPTION OF ORGANIZATION

1. Title of Activity _____

   _____

2. Address of Activity _____

   _____

3. Approximate number of persons working in your organization _____

4. Briefly describe your activity's mission _____

   _____

   _____

5. The majority of civilian employees in your organization are: (check one)

   professional _____

   white collar _____

   blue collar _____

6. What is the approximate percentage of military employees?

   _____% military

II. PROGRAMS

7. Has your organization undertaken any efforts specifically directed at productivity improvement in the last two years?

____ yes ____ no

8. If you said yes to question 7, briefly describe these efforts:

_____

_____

_____

9. Which of these programs are still in operation?

_____

_____

_____

10. How would you evaluate the effectiveness of each program?

_____

_____

_____

_____

11. How many of your employees received performance awards in FY80?

(approximate) _____

12. How many beneficial suggestion awards were approved in FY80?

(approximate) _____

13. How familiar are you with performance contingent reward systems that have been implemented experimentally in a few Navy organizations? (check one)

Very familiar _____

Somewhat familiar _____

Not at all familiar _____

14. If you are familiar with performance contingent reward systems, how would you evaluate the feasibility of a similar reward system in your organization. Please describe.

_____

_____

_____

_____

15. How would you rate your familiarity with the concept of Quality Control Circles: (check one)

Very familiar _____

Somewhat familiar _____

Not at all familiar _____

16. If you are at all familiar with Quality Circles, has your familiarity come from: (check all that apply)

_____ contact with Quality Circle consulting firm(s)

_____ contact with other organizations that have Quality Circle programs in operation

_____ reading about Quality Circles

_____ other (please specify) _____

*Please list a name and phone number of a person in your organization that may be contacted for information regarding productivity improvement plans _____

For this section of questions: if you feel you are familiar with the concept of Quality Circles but are not in the process of implementing nor have already implemented them please answer only questions 17-19 on this page. If you are in the process of implementing a Quality Circle program answer only questions 20-31 on the following pages. If you have already implemented Quality Circles answer only questions 32-40 on the last page.

Questions 17-19 - to be answered by those who are familiar with Quality Circles.

17. From what you know about Quality Circles, do you feel they could be successful in you organization?

_____ yes _____ no

18. If you said yes to question 17, what would you expect the positive outcomes of Quality Circles to be?

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

19. If you said no to question 17, what do you think would be the major obstacles (check all that apply)?

_____ lack of management's support

_____ lack of employee interest

_____ the concept of Quality Circles is not good

_____ don't expect Quality Circles to have a lasting effect

_____ there is no incentive for employees to participate

_____ the personnel in your organization are not suited for Quality Circles

_____ other (specify) _____

Questions 20-31 - for those who are in the process of implementing Quality Circles.

20. Have you decided on a consulting firm to assist you in training and implementation of a Quality Circle program:

_____ yes _____ no

21. If you have, what firm have you selected? _____

_____

22. Have you sent any members of your organization to facilitator training?

_____ yes _____ no

23. Have you conducted any training (for Quality Circle leaders) within your organization?

_____ yes _____ no

24. Have you conducted any Quality Circle training for members?

_____ yes _____ no

25. Do you have any circles in operation yet? _____ yes _____ no

26. If yes, how many? _____

27. What do you expect Quality Circles to accomplish? (please describe)

_____

_____

_____

_____

_____

28. What is your reaction to the Quality Circle program so far? (check one)

_____ very positive

_____ somewhat positive

_____ somewhat negative

_____ very negative

29. Explain your reaction _____

_____

_____

_____

30. Please describe any positive or negative effects you feel involvement in the Quality Circle program has had on your employees thus far:

31. Also, indicate any positive or negative effects you feel the Quality Circle program has had on your organization thus far:

If your organization has already implemented a Quality Circle program please answer questions 32-40.

32. What consulting firm did you use? _____

_____

33. When did your first circles begin their meetings? _____
Month / Year

34. How many circles did you start with? _____

35. How many circles do you have in operation now? _____

36. What is your reaction to the Quality Circle program so far? (check one)

_____ very positive

_____ somewhat positive

_____ somewhat negative

_____ very negative

37. What did you expect Quality Circles to accomplish? (please describe)

_____

_____

_____

38. What evidence do you have so far that you have accomplished what you intended to?

_____

_____

_____

39. Please describe any positive or negative effects you feel involvement in the Quality Circle program has had on your employees.

_____

_____

_____

40. Please describe any positive or negative effects you feel the Quality Circle program has had on your organization?

_____

_____

_____

APPENDIX B

QUALITY CIRCLE CONTACTS

Navy

Naval Material Command Headquarters
Office of Productivity Management (OOK)
Washington, D. C.
Dave Francis; Frank Curhan
AUTOVON 222-3201

Norfolk Naval Shipyard[1]
Phil Bannevich
AUTOVON 961-7948
(804) 393-7948

Naval Ordnance Station
Louisville, KY
James Witt or Dave Wright
AUTOVON 989-5421/989-5418
(502) 367-5421/-5418

Naval Air Rework Facility
North Island
Jake Bluford, Code 900
(714) 437-6637

Naval Electronics Systems Engineering
Vallejo, CA
Mr. Regner
AUTOVON 253-4191

Naval Supply Center
San Diego, CA
Tommy Garcia
(714) 235-3481

Naval Air Rework Facility
Alameda
George Bott
AUTOVON 686-2088
(415) 869-2088

Public Works Center
San Diego, CA
Allen Merwin
(714) 235-2655

Long Beach Naval Shipyard
R. Patison
F. Santone
(213) 747-7839
AUTOVON 360-7839

Charleston Naval Shipyard
Charleston, SC
Robert Thompson
AUTOVON 794-6233
(803) 743-6233

Philadelphia Naval Shipyard
Mr. Wirtschafter
(215) 755-4916

Naval Electronics System Engineering Center
San Diego, CA
Bill Ratsch
(714) 225-4184

Navy Personnel Research and
Development Center
San Diego, CA
Leanne Young Atwater
AUTOVON 933-6935
(714) 225-6935
Stephen Sander
AUTOVON 933-6400
(714) 225-6400

[1]The Norfolk Naval Shipyard has created two videotapes describing their experiences with Quality Circles. They are very informative and well done. (See form, p. A-5, for ordering one or both of these tapes.)

Industry

Hughes Aircraft Company
William E. Courtright, Quality Circle Administrator
Bldg. 6, Mail Station C-161
Culver City, CA 90230
(213) 391-4050

Lockheed Missiles and Space Company
Dr. Tamler, QC Circle Coordinator
Sunnyvale, CA
(408) 742-9989

Northrop Corporation, Aircraft Group
Bob Patchin, Director of Productivity Improvement Programs
Hawthorne, CA
(213) 970-3685

Solar Turbines International
Tom Erickson, Coordinator
George Merrill, Facilitator
San Diego, CA
(714) 238-6617

Westinghouse
Gerald Swartz, Facilitator; Vivian Comstock, Facilitator
Baltimore, MD
(301) 765-6325

Researchers

Dr. Robert Amsden
University of Dayton, School of Business
Dayton, Ohio
(513) 229-2217

Dr. Frank Gryna
Bradley University, Department of Industrial Engineering
Peoria, IL 61606
(309) 676-7611, ext. 214

Dr. Robert Cole
University of Michigan, The Center for Japanese Studies
Ann Arbor, MI

Carolyn Burstein
Acting Director of Productivity Research
Office of Personnel Management
Washington, D. C. 20415
(202) 632-6164

QC Consultants and Organizations

Quality Control Circles, Inc.
Higgins & Root Bldg., 2nd Floor
400 Blossom Hill Road
Los Gatos, CA 95030
(408) 358-2711
(408) 867-4121
Wayne Ricker, President

International Association of Quality Circles (IAQC)
P.O. Box 30635 Midwest City, Oklahoma 73140
(405) 737-6450
Don Dewar, President

Quality Circle Institute
234 S. Main St.
Red Bluff, CA 96080
Don Dewar, President

J. F. Beardsley & Associates, International, Inc.
4998 Harmony Way
San Jose, CA 95130
(408) 866-1306

Publications of Interest

The Quality Circles Journal published by IAQC.

The Quality Circle Quarterly published by IAQC

The IAQC Annual Conference Transactions

How to Order Navy Video Tapes on Quality Circles

Title I - Quality Circles at Norfolk Naval Shipyard (released May 1980) (Index no. TV-5-80-79)

Title II-A - Time for People Building and Management Support (Norfolk Naval Shipyard) (Index No. TV-2-81-101) (released February 1981)

Specify: Title(s)

Index number(s)

Return address with zip code

Requester's name and phone number with area code

Provide: 3/4"/30 minute cassette tape for each tape, either SONY or SCOTCH. Other brands are not compatible with reproduction equipment. Also can accomodate BETA and VHS 1/2" if so specified and tape provided.

Mail requests to: Norfolk Naval Shipyard
Central Video Library
Photographic Arts Staff (240.02)
Portsmouth, VA 23709

Attn: Paul Michels

APPENDIX C

ANNOTATED BIBLIOGRAPHY OF SELECTED QUALITY CIRCLE MATERIALS

ANNOTATED BIBIOGRAPHY OF SELECTED QUALITY CONTROL CIRCLE MATERIAL

Amsden, R. T. Application of statistical theory and methodology in QC Circles. IAQC Quarterly, 3rd Quarter, 1978.

This article discusses in detail the statistics used by QC Circles, the development of new statistical methods for use by QC Circles, and the application of statistics.

Amsden, R. T., & Amsden, D. M. Problems with QC Circles, IAQC International Conference Transactions, 1980, 155-159.

Some of the problems with QC Circles are: (1) management's use of QC Circles as a motivational tool rather than as a problem solving style of management, (2) implementation without preparation, or on too large a scale, (3) the QC Circle term being used as a catch-all for all kinds of programs, (4) QCs being seen as a fad or panacea, and (5) consulting that does not include follow-through and monitoring of long-term aspects.

Amsden, R. T., & Amsden, D. M. The research aspects of QC Circles. IAQC International Conference Transactions, 1979, 31-36.

Proposed research is briefly described. Objectives: (1) to identify universal and essential components of QC Circles, and (2) to quantify relationships of various inputs to QC Circle successes. Phases of research: (1) literature review, (2) interview with firms, (3) discussion with professionals, and (4) publication of results. Data analysis: Look for common characteristics of QC Circles. Contributions to fields of: (1) productivity improvement, (2) problem solving, and (3) statistical quality control.

Amsden, R. T., & Amsden, D. M. Results of research on QC Circles, ASQC Technical Conference Transactions, Atlanta, 1980.

In this paper we outline the results of several years of research about QC Circles. The first topic is the distinction of the inputs essential to Circle success from those inputs which are not necessary. Then we quantify the relationships, as far as known, between these inputs and Circle accomplishments. A corollary to these topics is discussion of the need, or lack of, for modification in America of the QC Circle concept as practiced in Japan.

There are many elements in the QC Circle concept. Some are external while others are internal. Some of these characteristics are definitional in nature; a few are even viewed as "sacred cows" by some people. We will list each element and discuss whether or not we perceive that it is essential. One criterion in making the distinction is the universality of the element: if every Circle incorporates a particular element, then it is essential either to the success of the Circle or to the definition to distinguish the QC Circle concept from other techniques.

Beardsley, J. F. The Quality Circle steering committee. IAQC International Conference Transactions, 1979, 52-58.

Beardsley states that the steering committee is the most important element of a successful QC Circle program. The need for operational policies, the responsibilities of the steering committee, the incorporation of the steering committee, and issues the steering committee should address are emphasized.

Cole, R. E. Diffusion of New Work Structures in Japan. IAQC International Conference Transactions, 1979, 59-65.

Discussed in this paper are: The diffusion of QC Circles in Japan including the role of Nikkeiron and JUSE, the movement toward small groups in the 1960s, and government enforced industry cooperation in diffusing management technical information. Also discussed are the differences between the U.S. and Japan with respect to the role of U.S. managers vs. Japanese industrial engineers, and the role of U.S. consultants vs. JUSE.

Cole, R. E. Japanese Quality Control Circles: Are they Exportable to U.S. Firms? World of Work Report, 1979, 4(6), 42;46.

Cole discusses QC Circles in Japan, including some shortcomings such as: QC Circles being seen as a burden, too much emphasis on productivity as opposed to human development, lack of union involvement, tendency to become ritualistic. Also described are some Japanese management principles that U.S. managers should try: Trust and loyalty building, training and development of employees, recognizing accomplishment, decentralization, and viewing work as a cooperative effort.

Cole, R. E. Made in Japan - Quality Control Circles. Across the Board, 1979, 16(11), 72-78.

This article describes the introduction of QC Circles to American industry, particularly at Lockheed and General Motors.

Cole, R. E. Work, mobility and participation. Berkeley: University of California Press, 1979.

A historical treatment of QC Circles in Japan is presented. Highlighted are the roles of Deming, Juran, and JUSE. Also, the training of foremen, statistical techniques, types of problems, public recognition, the voluntary nature of groups, and revitalization are discussed (pp. 135-143). The development of the QC program at Toyota Auto Body during 1964-1975 is described. Included are the details of the operation of the Circles and the management of the program. The program resulted in increases in productivity, morale, and retention, and decreases in defects and accidents. Other factors that may have influenced the results are mentioned. Problems such as QC Circles being seen as a burden, excessive pressure and competition, and apathy are discussed (pp. 160-167).

Cole, R. E. Will QC Circles Work in the U.S.? Quality Progress, 1980 (July), 30-33.

This article describes some of the adjustments American industry will have to make if the concept of QC Circles is to be sustained. These include involving unions, and middle management and consideration of monetary incentives.

Comstock, V. C. & Swartz, G. E. Predictable Developmental Stages in the Evolution of a Quality Circle. IAQC International Conference Transactions, 1980, 52-55.

The authors describe the evolutionary stages of Quality Circles: Introduction, dependence, counterdependence, resolution of authority, enchantment, disenchantment, interdependence, closure, and discorporation.

Dewar, D. L. Quality Circles: Answers to 100 Frequently Asked Questions. Red Bluff, CA: Dewar Associates, 1979 (48 pages).

Answers to questions on objectives, organization and implementation, operation, steering committee, facilitator, leader, project themes, results, recognition, management presentation, training, consulting, potential problems, and IAQC are given.

Glaser, E. M. Quality Control Circles in Japan. Productivity Gains Through Worklife Improvement. New York: Harcourt, Brace, Jovanovich, 1976, 183-188.

Juran's article, The QC Circle phenomenon (1967), is summarized, and highlights from the Lockheed (January 1974) Report are discussed.

How To Do It Better. Newsweek, 8 September 1980, 59.

This article, part of a special report on the U.S. productivity crisis, briefly describes QC Circles and their use in the U.S. A few companies with QC programs and the resultant benefits are cited.

Schleicher, W. R. Quality Control Circles save Lockheed nearly $3 million in Two Years. Quality, May 1977, 14-17.

The key elements of the Lockheed program, the function and structure of circles, training aids, and the results of the program are discussed.

Sikes, W., Connell, L., & Donovan, J. M. Learning from Experience: Ingredients for Success and Popular Myths about Quality Circle programs. IAQC International Conference Transactions, 1980, 90-95.

Six factors necessary for the success of QC Circles are discussed. They are: Active management support, circle identity and cohesiveness, goals, feedback, meetings, and recognition. Contrary to popular views, Honeywell has found that: Membership in circles need not be voluntary, training in analysis techniques is unnecessary, circles needn't be homogeneous, and the facilitator only needs to work with new circles.

Talking in Circles Improves Quality. Industry Week, 14 February 1977, 62-64.

This article describes the implementation of the QC Circle program at Lockheed. Included are the results of a morale survey.

The Workers Know Best. Time, 28 January 1980, 65.

This short article briefly describes QC Circles, and highlights the Westinghouse QC Circle program. Examples of cost saving ideas generated by some of its Circles are given.

White paper: If Japan Can...Why Can't We? NBC-TV, 1980, 80 minutes

This video presentation focuses on American and Japanese productivity. Highlighted are the effects of W. Edwards Deming's statistical technique, Quality Control Circles, and the benefactor role of companies on Japanese productivity. Also spotlighted are innovative American companies - Nucorr, Donnelly Mirrors, Romac Industries, and Nashua.

Yager, E. Examining the Quality Control Circle. Personnel Journal, 1979, 58(10), 682-684; 708-709.

A good general overview of QC Circles is provided. Yager defines and describes QC Circles, and discusses results, problems, and the philosophy of QC Circle programs. He argues persuasively for QC Circles.

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